FORM PTO-1390
REV. 5-93

US DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEYS DOCKET NUMBER
P99,0498

U.S.APPLICATION NO. (if known, see 37 CFR 1.5)
09/284581

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP97/05498	7 October 1997	15 October 1996

TITLE OF INVENTION
"METHOD OF HANDLING SERVICE CONNECTIONS IN A COMMUNICATION NETWORK"

APPLICANT(S) FOR DO/EO/US
Ansgar DIRKMANN, Thomas WERNER and Jan HAMANN

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay.
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. ☒ A copy of International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau)
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2).

7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.

8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).)

10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; **(PTO 1449, Prior Art, Search Report).**

12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.
    (SEE ATTACHED ENVELOPE)

13. ☒ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.

14. ☐ A substitute specification.

15. ☐ A change of power of attorney and/or address letter.

16. ☒ Other items or information:
    a. ☒ Submittal of Drawings
    b. ☒ **EXPRESS MAIL #EL294311000 US, dated April 15, 1999.**

U.S.APPLICATION NO. (if known, see 37 C.F.R. 1 5)	INTERNATIONAL APPLICATION NO. PCT/DE97/02170	ATTORNEY'S DOCKET NUMBER P99,0498

17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5): Search Report has been prepared by the EPO or JPO . . . . . $840.00 International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) . . $700.00 No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but international search fee paid to USPTO (37 C.F.R. 1.445(a)(2) . . . . . $770.00 Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2) paid to USPTO . . . . . $1040.00 International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) . . . . . $ 96.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 840.00	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).	$	

Claims	Number Filed	Number Extra	Rate		
Total Claims	5 - 20 =		X $ 18.00	$	
Independent Claims	2 - 3 =		X $ 78.00	$	
Multiple Dependent Claims			$270.00+	$	
TOTAL OF ABOVE CALCULATIONS =				$ 840.00	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 C.F.R. 1.9, 1.27, 1.28)				$	
SUBTOTAL =				$ 840.00	
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$	
TOTAL NATIONAL FEE =				$ 840.00	
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). $40.00 per property +					
TOTAL FEES ENCLOSED =				$ 840.00	
				Amount to be refunded	$
				charged	$

a. ☒ A check in the amount of $ 840.00 to cover the above fees is enclosed.

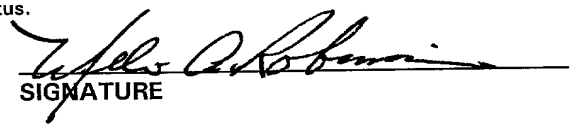
b. ☐ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **08-2290**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Hill & Simpson
A Professional Corporation
85th Floor Sears Tower
Chicago, Illinois 60606



SIGNATURE

Melvin A. Robinson
NAME

31,870
Registration Number

IN THE UNITED STATES ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

"PRELIMINARY AMENDMENT"

APPLICANT: A. DIRKMANN et al.

SERIAL NO.: EXAMINER:

FILING DATE: ART UNIT:

INTERNATIONAL APPLICATION NO.: PCT/EP97/05498

INTERNATIONAL FILING DATE: 7 October 1997

INVENTION: METHOD OF HANDLING SERVICE CONNECTIONS IN A COMMUNICATION NETWORK

Hon. Assistant Commissioner for Patents
Box PCT
Washington D.C. 20231

SIR:

Amend the above-identified international application before entry into the national stage before the U.S. Patent & Trademark Office under 35 U.S.C. §371 as follows:

IN THE SPECIFICATION

On substitute page 1, and before the title, insert --

SPECIFICATION

TITLE--;

after the title, insert --

BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to a communication network and the handling of service connections in the communication network including an Internet access system and a switching center.

Description of Related Art--;

in line 5, change "The" to --As a result, there is a substantial increase in the--;

in line 6, after "networks" delete "thus increase";

in line 7, delete "to a substantial degree";

in line 8, change "Said" to --The--;

in line 10, delete ", for example" and after "traffic" delete ",";

in line 11, change "for an only slightly increasing" to --when there is a slight increase in--;

in line 13, delete "therefore";

in line 14, delete "be able to";

before line 15, insert --

SUMMARY OF THE INVENTION--;

in line 15, delete "said";

in line 19, change "Said" to --The-- and change "the subject matters of claim 1 or 5." to --a method and system for controlling connections in a communication network that includes setting up a signaling connection between a subscriber of the communication network and a service access system based on a service connection request by the subscriber and setting up a payload connection associated with the signaling connection between the service access system and the subscriber only given data traffic for a service and

clearing down the payload connection after the data transmission.

Another object of the invention provides a service that is a voice service and/or a data service.

A further object of the invention provides charging a service by the communication network for a time interval in which the signaling connection and the payload connection simultaneously exist for the service.

Another object of the invention provides a method in which the step of clearing down the payload connection does not occur immediately after the end of data transmission but occurs immediately before the expiration of the time interval already charged.--;

in line 20, change "the document" to --e.g.--;

in line 21, change "thirteenth" to --Thirteenth--; and

in line 24, change "means" to --system--.

On substitute page 1a, in line 3, change "said" to --the--;

in line 6, delete "thus";

in line 9, delete "thereof";

in line 12, delete ", for example,"; and

in line 15, change ", as a result whereof" to --. To this end,--;

in line 17, change "lies in the possibility of" to --is that the method provides--.

On page 2, in line 1, change "is comprised in the possibility of" to --includes--;

in line 7, change "drawing" to --drawings--;

before line 8, insert --

DETAILED DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic diagram of a switching center that links the access network to the Internet.

Figure 2 shows three graphs illustrating the D-channel traffic, B-channel occupation and Internet traffic verses time.

Figure 3A is a block diagram of a communication network incorporating principles of the invention.

Figure 3B is a block diagram of a communication network incorporating principles of the invention.

Figure 3C is a block diagram of a communication network incorporating principles of the invention.

Figure 4 is a schematic diagram of the processing by the software of the switching center.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS--;

in line 10, change "Said" to --The--;

in line 12, change "=" to --is a--;

in line 13, change "comprises" to --includes--;

in line 14, before "work" insert --a--; and change "in any case, whereby the" to --. The--;

in line 15, change "comprises" to --includes--;

in line 16, before "customer" insert --"-- and after "equipment" delete "in" and insert --"--;

in line 17, delete "English" and before "connected" change "are" to --is-- and after "center" change "are thus" to --is--;

in line 20, change "means" to --system--;

in line 22, change "comprises" to --includes--;

in line 24, delete "is thus" and delete "thereof";

in line 27, change "A" to --To this end, a-- and delete "also";

in line 28, delete "thereby"; and

in line 29, after "method" insert --including the temporary setup and cleardown of the payload channel connection for burst-like data transmission--.

On page 3, change "Via his terminal equipment, the" to --Specifically, a-- and change "sevrice [sic]" to --service--;

in line 2, after "POP" insert --server-- and after "D-channel" insert --via the user's terminal equipment--;

in line 3, change "The" to --As a result, the--; and delete "thereby";

in line 4, after "connection" insert --is-- and change "the authentification" to --authenticated--;

in line 13, delete "are, alternatively,";

in line 21, change "Figure 3 shows a schematic illustration" to --Figures 3A-3C show schematic illustrations--;

in line 22, change "the case of" to --,--;

in line 24, change "(in" to --. In--;

in line 26, delete "for example," and before "corresponding" insert --a--;

in line 27, delete ")";

in line 29, change "Figure 3" to --Figures 3A-3C--; and

in line 31, before "connection" insert --signaling--.

On page 4, in line 4, change "thus ensues" to --occurs--;

in line 10, after "D-channel;" insert --and--;

in line 12, change "authentification" to --authentication--;

in line 16, change "dataa [sic]" to --data--;

in line 17, after "ISDN" insert --("Integrated Service Digital Network")--;

in line 18, change "explained" to --above-- and after "connection" insert --is--;

in line 23, change "said" to --the--;

in line 27, change "[...]" to --and--; and

in line 28, change "in that" to --since the--.

On page 5, in line 10, after "in which" insert --the required--;

in line 11, delete "required therefor" and delete "in an" and delete "condition";

in line 12, change "Said" to --The-- and change "not insignificant" to --significant--;

in line 16, delete ", respectively,";

in line 17, delete ", respectively,";

in line 20, change ", i.e., for example," to --(i.e.,--;

in line 21, change "," to --)--;

in line 25, change ";" to --method.--;

in line 26, change "this" to --This cost-saving--; and

in line 28, change "authentification" to --authentication--.

On page 6, in line 1, change "authentification" to --authentication-- and delete ", namely,";

in line 6, delete "thereof, first";

in line 7, change "pf" to --of-- and change "are avoided and, second," to --and--;

in line 8, after "center" insert --are avoided--;

in line 12, change "comprises" to --includes--;

in line 15, change "a" to --the--; and before "customer" insert --or--;

in line 16, delete "by";

in line 17, after "generating" insert --and analyzing-- and after "elements" delete "as well as in analyzing such information" and insert --.--;

in line 18, delete "elements." and change "such" to --the-- and after "setup of" insert --the--;

in line 22, delete "what are referred to as";

in line 23, delete "what is";

in line 27, delete "what is"; and

in line 28, change "said" to --the--.

On page 7, in line 1, after "CCITT" insert --("Consultative Committee International Telephony and Telegraphy")--; and

in line 12, change "comprises" to --includes--.

On page 8, in line 3, change "said" to --the--; and

in line 5, change "in turn" to --, in turn,--.

On page 9, in line 2, delete ", respectively,";

in line 4, change "Transport of" to --In transporting--;

in line 5, change "Two" to --the following two--;

in line 6, after "mechanism" insert --; and--;

in line 12, change "Example: The" to --For example, the--;

in line 17, change "procedures [sic]" to --procedure--;

in line 18, before "not correlated" insert --is--;

in line 19, delete "type" and delete "thus" and delete "in order";

in line 20, change "independently" to --independent-- and before "bearer" insert --the--;

in line 21, change "authentification" to --authentication--;

in line 24, delete "type";

in line 25, change "Transport of" to --Transporting--;

in line 26, change "Four categories are defined:" to --defines the following four categories:--;

in line 27, after "connectionless" insert --;--;

in line 28, after "connectionless" insert --;--; and

in line 29, after "connection-oriented" insert --; and--.

On page 10, in line 6, change "authentification" to --authentication--;

in line 7, change "is begun" to --starts--;

in line 8, change "without" to --e.g. without a--;

in line 10, change "Said" to --The--;

in line 12, change "B channel-associated" to --B-channel-associated--;

in line 16, change "Figure 3" to --Figures 3A - 3C--;

in line 18, delete ", respectively,";

after line 29, insert the following new paragraph --

Although other modifications and changes may be suggested by

those skilled in the art, it is the intention of the inventors to embody within the patent warranted hereon all changes and modifications as reasonably and properly come within the scope of their contribution to the art.--.

IN THE CLAIMS

On substitute page 11, in line 1, change "New Patent Claims" to -- What is Claimed Is:--;

Please cancel claims 1 through 5 without prejudice.

Add new claims 6 through 10.

6. A method for controlling connections in a communication network, comprising the steps of:

setting up a signaling connection between a subscriber of the communication network and a service access system based on a service connection request by the subscriber; and

setting up a payload connection associated with the signaling connection between the service access system and the subscriber only given data traffic for a service and clearing down the payload connection after the data transmission.

7. The method of claim 6, wherein the service is at least one of a voice service or a data service.

8. The method of claim 6, further comprising the step of:
charging a service by the communication network for a time interval in which the signaling connection and the payload connection simultaneously exist for the service.

9. The method of claim 8, wherein the step of clearing down the payload connection does not occur immediately after the end of data transmission but occurs immediately before the expiration of the time interval already charged.

10. A method for controlling service connections in a communication network in order to support access to a service via the communication network, comprising the steps of:
initiating the setup of a service-related signaling connection between a subscriber and a service access system;
initiating the setup of a payload connection between the service access system and the subscriber associated with the signaling connection only given data traffic and initiating the cleardown of the payload connection after data transmission.

IN THE ABSTRACT

Change the heading from "Abstract" to --Abstract of the Disclosure--;

Please amend the Abstract of the Disclosure as follows. Please delete lines 1-6 and substitute the following paragraph.

--A method for controlling connections in a communication network including setting up a signaling connection between a

subscriber of the communication network and a service access system based on a service connection request by the subscriber; and setting up a payload connection associated with the signaling connection only between the service access system and the subscriber given data traffic for the service and clearing down the payload connection after the data transmission.--.

REMARKS

The present Amendment makes editorial changes and corrects typographical errors in the specification in order to conform the specification to the requirements of the U.S. Patent practice. No new matter is added thereby. Original claims 1-5 have been canceled in favor of new claims 6-10. However, claims 6-10 have been presented solely because the revisions by bracketing and underlining which would have been necessary in claims 1-5 in order to conform those claims to the requirements of the U.S. Patent practice would have been too extensive, and thus would have been too burdensome. The cancellation of claims 1-5 does not constitute an intent on the part the Applicant to surrender any of the subject matter of claims 1-5.

The foregoing amendments to the specification and claims under Article 41 of the Patent Cooperation Treaty place the application into form for prosecution before the U.S. Patent and Trademark Office under 35 U.S.C. §371. Accordingly, entry of these amendments before examination on the merits is hereby requested.

Respectfully submitted,

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ATTORNEY FOR APPLICANT

METHOD OF HANDLING SERVICE CONNECTIONS IN A COMMUNICATION NETWORK

A strong growth of the traffic volume in the access area to services that are offered by other networks, for example the Internet, is connected with the strong growth of Internet services and other special services. The demands made of the exchanges forming the access area to these networks thus increase to a substantial degree.

Said situation is additionally intensified in that current exchanges are not dimensioned for the absolute call lengths and distributions of call lengths that mainly occur, for example in the Internet traffic, to the entry nodes of the Internet service providers. Even for an only slightly increasing Internet traffic volume, additional exertions of the Internet access service operators are therefore needed for expanding the capacity of their switching centers in order to be able to maintain the actual voice traffic with the required quality features.

The invention is based on the object of placing said network operators in the position of governing the increasing access traffic to the entry nodes for special services, particularly for example Internet services, without an involved expansion of the switching centers.

Said object is achieved by the subject matters of claim 1 or 5.

It is already known (see the document, Jay Tao et al., "Internet Access via Baseband and Broadband ISDN Gateways", Proceedings of the thirteenth Annual International Phoenix Conference on Computers and Communications, 12-15 April 1994, Phoenix, USA, pages 485-490) to check in an Internet access means connected to a switching center to see when an Internet connection is closed in order to subsequently initiate the cleardown of the (dialed) connection previously set up for the Internet connection as soon as possible. What is thereby proposed as an especially simple version of monitoring is a time-monitoring that monitors the Internet connection for

inactivity. The time span monitored for inactivity, however, dare not be selected too short since the problem otherwise occurs that said (dialed) connection is cleared down even though the TCP connection was not yet closed.

Up to now, a dialed connection that was once set up was thus maintained during the entire duration of the connection to a special services provider in such a way that a payload channel is also occupied even in phases of the connection without data transmission. As a result thereof, the above-described disadvantages arise for the operators of the switching centers, since current switching centers are not dimensioned for the absolute call lengths and call length distributions that mainly occur, for example, in the Internet traffic to the entry nodes of the Internet service providers.

As a result of the inventive method, the load of the switching centers by special services access traffic is limited, as a result whereof the switching centers need not be dimensioned larger and/or expanded by the respective operator.

A further advantage of the invention lies in the possibility of designational control of the usage charges arising for the subscribers in the access network.

A further advantage of the invention is comprised in the possibility of offering features by the switching center in the data transmission pauses over what are then the free payload channels and/or over the still-occupied payload channel after the end of the burst-like data transmission in the time available up to the end of the time interval that has already been charged.

An exemplary embodiment of the invention is explained in greater detail below on the basis of the drawing.

Figure 1 shows an entry node, i.e. a switching center that links the access network to the Internet. The switching center contains, for example, a switching system of Siemens AG, namely the switching system EWSD. Said switching system is expanded by an Internet line/trunk group LTG-I that can also contain POP functions in the illustrated case (POP server = point of presence server), but that comprises the interface to the POP server (for example, work station computer of the Sun company) in any case, whereby the POP server in turn comprises the PDH/SDH interfaces to the Internet. The terminal equipment CPE (referred to as customer premises equipment in English) that are connected to the switching center are thus connected to a switching center in the example of Figure 1 that already represents the entry node into the Internet.

Due to the introduction of a specific service means LTG-I (Internet LTG), which is connected to the switching network SN of the switching system like every normal line/trunk group LTG but comprises specific functions for the Internet traffic, the Internet traffic is separated from the ordinary traffic and is thus controlled by separate software. As a result thereof, undesired interactions with existing features of the switching center can be avoided.

A great increase in the complexity of the software in the switching center is also thereby avoided.

Figure 2 shows the principle of the inventive method.

Via his terminal equipment, the user of an Internet sevrice [sic] sets up a connection to the POP of the Internet service provider with the D-channel. The ISDN B-channels are thereby not used.

After the connection setup and the authentification, the user delivers a request to the service provider for specific contents or services. The available bandwidth of the D-channel is adequate for these tasks.

The POP of the service provider recognizes the request and edits the data for transmission. Subsequently – controlled by the POP –, the B-channel connection to the user is set up and the requested data, for example files or home pages, are transmitted.

After successful transmission, the B-channel connection is maintained for the remaining running time of the charge interval that has already been paid and is cleared down before the next charge pulse are, alternatively, is maintained for the duration of a predetermined time span.

After the user has processed the requested data, for example has read a requested home page, a new request can be delivered that results in a renewed setup and cleardown of a B-channel.

For clearing down the connection to the Internet service provider, a corresponding message is sent to the POP over the D-channel and the D-channel connection is subsequently cancelled.

Figure 3 shows a schematic illustration of the call flow for an Internet session for the case illustrated in Figure 1, namely the case of the connection of the POP server (server of the Internet service provider) in the subscriber line switching center (in the illustrated call flow case, no use of the free B-channels ensues in the transmission pauses of the data transmission for offering info such as, for example, charge information; otherwise, corresponding message would be inserted into Figure 3).

The executive sequence of an Internet online session is explained in greater detail below on the basis of the call flow according to Figure 3.

First, the Internet service request made via a corresponding terminal equipment is recognized in the line/trunk group LTG and a connection, which

is independent of the payload connection set up later (bearer independent), is set up via the signalling channel. The D-channel is thereby used as what is referred to as uplink for the signalling from the user to the switching center.

The connection setup thus ensues without occupying payload channels. The following advantages derive as a result thereof:

- the traffic load of the switching center is limited;
- no fixed signalling allocation is required, i.e. the message sequence and/or the sequence of the messages is not prescribed;
- the facility messages (of a potentially proprietary functional protocol) can be sent in a loose sequence over the D-channel;
- the switching-conditioned times, for example for entry and authentification procedures, can be intentionally differently charged/acquired (for example, free of charge) than the times for the actual data transmission since there is the possibility of handling this traffic controlled by separate software for Internet traffic. The times of the dataa [sic] transmission can in turn be charged differently than standard ISDN connections.

After the explained connection setup, a payload channel is set up for the connection only given data traffic, namely in downlink direction, i.e. in the direction of the subscriber. The downlink setup of the payload channel is initiated by the POP server when the POP server is not integrated in a switching center of the access network. Otherwise, i.e. given integration of the POP server in a switching center, said setup is initiated by the switching center.

After the setup of a payload channel because of data traffic and a burst-like data transmission, a cleardown of the payload channel connection ensues given maintenance of the bearer-independent signalling relationship between the subscriber's terminal equipment [...] the switching center with the POP.

The following advantages derive in that payload channels are occupied only given traffic volume, i.e. only temporarily:

- payload channels are only briefly occupied given data traffic that occurs burst-like (for example, Internet traffic, voice traffic, data traffic, fax traffic, electronic data exchange (electronic data interchange));
- there is the possibility of utilizing the payload channels that are free in the data transmission pauses for the implementation of features by the switching center, potentially for the transmission of information offered by the VST such as, for example, charge information;
- designational charging/acquisition of the times for making use of the access network for the data transmission since the charge for a payload connection is dependent on the duration in which payload channels required therefor are in an active condition.

Said targeted charging represents a not insignificant competitive advantage for the operator of the access network in an increasingly competitive situation with price wars for customers.

The charging is usually initiated and controlled by the call control. This control can stop or, respectively, interrupt the charging given release of the B-channel or channels, and can also restart it or, respectively, let it continue to run given renewed occupation/activation of the payload channels.

It is ideally cost-saving for the ultimate consumer/subscriber when the burst-like data transmission occurs within a charge interval, i.e., for example, has ended no later than one second before the expiration of a charge interval, so that the next charge interval does not start and, thus, charge units are no longer incurred at its beginning. This can be designationally controlled by software, for example given integration of the POP in the switching center. This method is cost-saving for all fee schedules that are not based on a to-the-second billing; this includes the great majority of all charging methods applied worldwide.

A further advantage of the above-described method is the clean separation between times for the entry and authentification procedures conditioned in terms of switching technology, times without B-channel occupancy but with D-channel occupancy in an active connection as well as times for payload channel occupations. Particularly the times for the entry and

authentification procedures, namely, can largely not be influenced by the subscriber and should therefore not be charged to the subscriber given proper use.

The processing of the Internet traffic by the specific line/trunk group LTG-I allows the handling of the Internet traffic with an independent software package. As a result thereof, first, undesired interactions with existing features pf the switching center are avoided and, second, a disproportional increase in the complexity of the software in the switching center.

The configurations of the functional D-channel protocol are described below. This serves to facilitate an understanding of the possibilities of the protocol, particularly for the realization of the invention.

The functional protocol comprises a sequence of functional information elements (FAC-IE). A functional information element, also referred to below as facility information element, requires a certain degree of intelligent processing by a terminal equipment (customer premises equipment CPE) and by the switching center to which the connection exists, namely both in generating such information elements as well as in analyzing such information elements. A sequence of such information elements serves for the setup of connections, i.e. of purely signalling relationships and, potentially, payload channel connections in the method described here.

Two categories of procedures are defined for the functional signalling of what are referred to as supplementary services.

The first category, what is referred to as the "separate messages" category, uses separate message types in order to indicate a desired function. The "HOLD" and "RETRIEVE" family of messages are included in this category.

The second category, what is referred to as the category of "common information elements", uses said facility information elements FAC-IE for the signalling of auxiliary services, but only for the signalling of auxiliary services that do not require any synchronization of resources between user and network.

The following terms, which are defined in CCITT Recommendation X.219, are employed for specifying procedures for the control of remote operations:

- remote operation
- operation classes
- connection-oriented transport mechanism
- connectionless transport mechanism,
- bearer related supplementary service procedure
- bearer independent supplementary service procedure.

Remote Operation

Procedures and components:

The remote operation protocol for handling FAC-IEs comprises the following procedures (means for sending and receiving messages):

- INVOCATION procedure
- RETURN_RESULT procedure
- RETURN_ERROR procedure
- REJECT procedure.

All necessary FAC-IEs for the processing of features are sent in a suitable D-channel message. The aforementioned procedures are the minimum pre-condition in order to set up and clear down connections by means of functional protocol.

The INVOCATION procedure is used in order to initiate an operation that is to be implemented by the other side. An operation is a matter of a part of a supplementary service, for example a feature.

The RETURN RESULT procedure is used in order to transmit the result (on the basis of an INVOCATION procedure) of a successfully implemented operation.

The RETURN ERROR procedure is used in order to transmit the ERROR information of an unsuccessfully implemented operation.

The REJECT procedure is used in order to reject the operation requested by the INVOCATION procedure or in order to reply.

Each of said procedures uses specific (message) components. The invoke, return result, return error and reject components are transported in facility information elements that are in turn sent in what are referred to as basic call control messages or in separate FACILITY messages between terminal equipment and switching center in order to set up or clear down signalling relationships and, potentially, payload channel connections.

The INVOCATION procedure thus uses the INVOKE component, the RETURN RESULT procedure uses the RETURN RESULT component, the RETURN ERROR procedure uses the RETURN ERROR component and the REJECT procedure uses the REJECT component.

The connection-oriented transport mechanism requires the establishment of a data link and a transport association between the service requester and the service provider. The mechanism allows procedures of the second category to be initiated wherein success and/or failure messages are required. The mechanism provides a call reference within the transport association that represents a means for the unambiguous association of the transport messages of a connection.

There is no transport association given the connectionless transport mechanism; rather, only a single transport message is respectively transmitted, whereby a dummy value is used as call reference. This mechanism allows the transfer of requests of operations about whose result no report ensues.

Supplementary Service Procedures that are Dependent on the Payload Connection.

This type of procedure is bound to procedures for the basic call control and to a payload connection that exists, is being set up or being cleared down. The call reference that is used by the basic call control procedure is adopted from the bearer connection-dependent INVOCATION procedures in order to correlate with the suitable transactions of the basic call control. The allocation

between the respective application on the terminal equipment and the corresponding switching-oriented program or, respectively, program status is thus achieved.

Transport of the components (dependent on the payload connection) Two categories are defined:

1. Point-to-point transport mechanism
2. Broadcast transport mechanism.

Suitable D-channel messages are used for the exchange of FAC-IEs. The transport procedures are bound to payload connections (connection setup, active phase of the connection, connection cleardown) that are identified by the call reference.

Example: The FAC-IEs are transported in FACILITY messages for the setup and cleardown of payload channel connections for the transmission of data bursts.

Supplementary Service Procedures that Are Independent of the Payload Connection

This type of procedures [sic] is independent of the procedures for the basic call control and not correlated with a payload connection, i.e. not correlated with a B-channel. This procedure type is thus ideally suited in order to set up a signalling relationship independently of bearer channel and to implement potential entry and authentification methods without occupying an auxiliary channel, in order to occupy one or two bearer channels for the implementation of the data transmission only given an immediately impending data transmission by switching to the bearer related procedure type.

Transport of the components (independently of the payload connection) Four categories are defined :

1. Point-to-point, connectionless
2. Broadcast, connectionless
3. Point-to-point connection, connection-oriented
4. Broadcast, connection-oriented.

The connectionless network protocol uses the "dummy" call reference. The FAC-IE is transported in a FACILITY message.

An example of the inventive method now follows that discloses the interworking of the bearer independent service procedure with a bearer related procedure.

a) An Internet connection that requires an authentification operation over the D-channel is begun with a bearer independent service procedure, i.e. without B-channel occupation. This service procedure can be connectionless (without defined signalling procedure) or connection-oriented;

b) Said service procedure must be switched to a bearer related service procedure for seizing a B-channel for phases of the burst-like data transmission or for the request/delivery of B channel-associated services, in that a call reference / bearer channel reference is requested in a facility message.

Figure 4 shows the fundamental processing of an Internet request by the software of a switching center. The message sequence ensues according to the principles explained by Figure 3.

The terminal equipment generate/analyze the messages of the functional protocol for the request of D-channel connections or, respectively, for the setup of connections via B-channels.

Function as Uplink:

After analysis of the functional messages (unpacking the messages) by the functional analysis software of the LTG of the switching center, the "Internet software" assumes the evaluation of the information and their processing (also, too, for the interworking with switching center-specific features).

Function as Downlink:

Given cleardown of B-channel connections, the "Internet software" assumes the call control. The functional protocol translator assumes the signalling-oriented handling of the messages.

New Patent Claims

1. Method for controlling connections in a communication network, characterized in that

a) on the basis of the request of a service connection by a subscriber of the communication network, a signalling connection with respect thereto is set up between the subscriber and a service access means (LTG-I, POP server);

b) a payload connection associated with the signalling connection is only set up between service access means and subscriber given data traffic for the service and is in turn cleared down after the data transmission.

2. Method according to claim 1, characterized in that the services are a matter of voice services and/or data services (for example, Internet services).

3. Method according to claim 1 or 2, characterized in that a service is only charged by the communication network for time spans in which a signalling connection and a payload connection simultaneously exists for the service.

4. Method according to claim 3, characterized in that the payload connection of a service connection is not cleared down immediately after the end of the data transmission but only immediately before the expiration of the time interval that has already been charged.

5. Service means of a switching system that

a) controls service connections in a communication in order to support the access to a service via the communication network,

characterized in that it

b) on the basis of the request of a service connection by a subscriber of the communication network, initiates the setup of a service-related signalling connection between subscriber and service access means (LTG-I, POP server);

c) additionally initiates the setup of a payload connection between service access means and subscriber associated with the signalling connection only given data traffic and in turns initiates the cleardown thereof after the data transmission.

Abstract

Method of Handling Service Connections in a Communication Network

An object of the invention is to place a network operator in the position or governing the increasing access traffic to services offered by other networks without an involved expansion of the switching centers.

This object is inventively achieved in that the payload connection required in the framework of a service connection is only set up given data traffic and is in turn cleared down after the data transmission.

FIG 1 "EWSD Internet Switch" With Additional Software-Features As A Result of EWSD

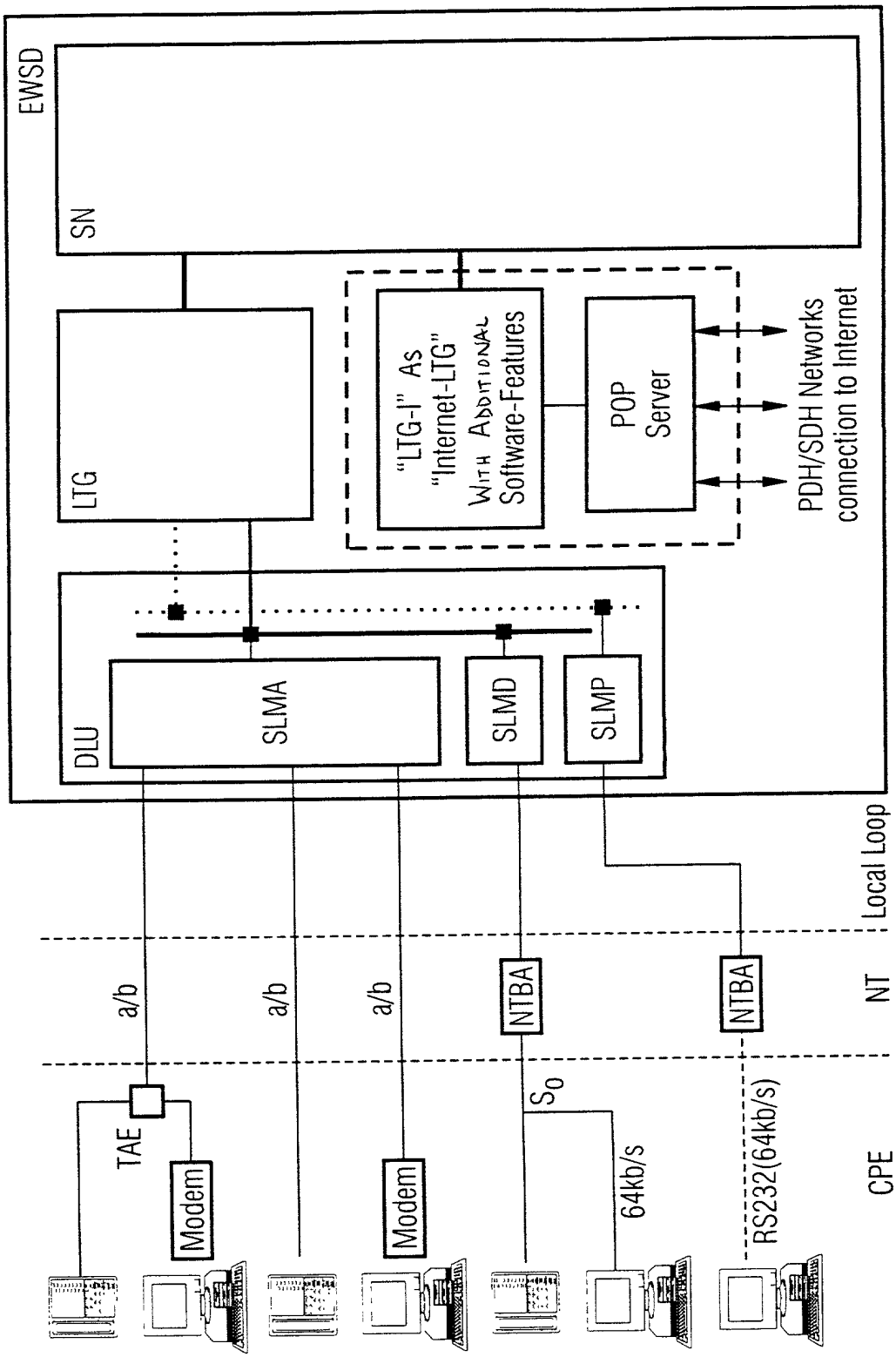


FIG 2 PRINCIPLE OF THE TEMPORARY SETUP AND CLEARDOWN OF THE PAYLOAD CHANNEL CONNECTION FOR BURST-LIKE DATA TRANSMISSION

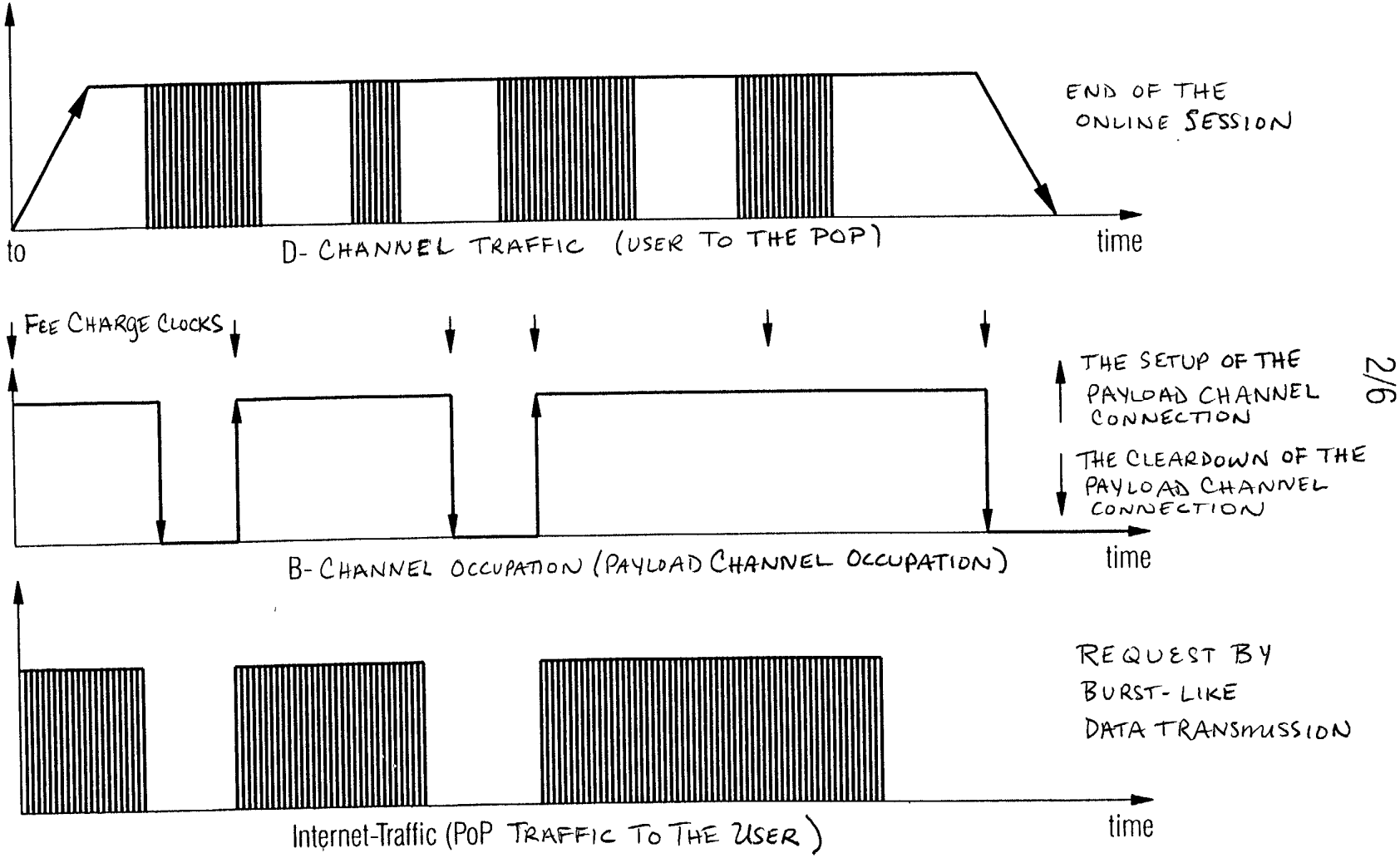
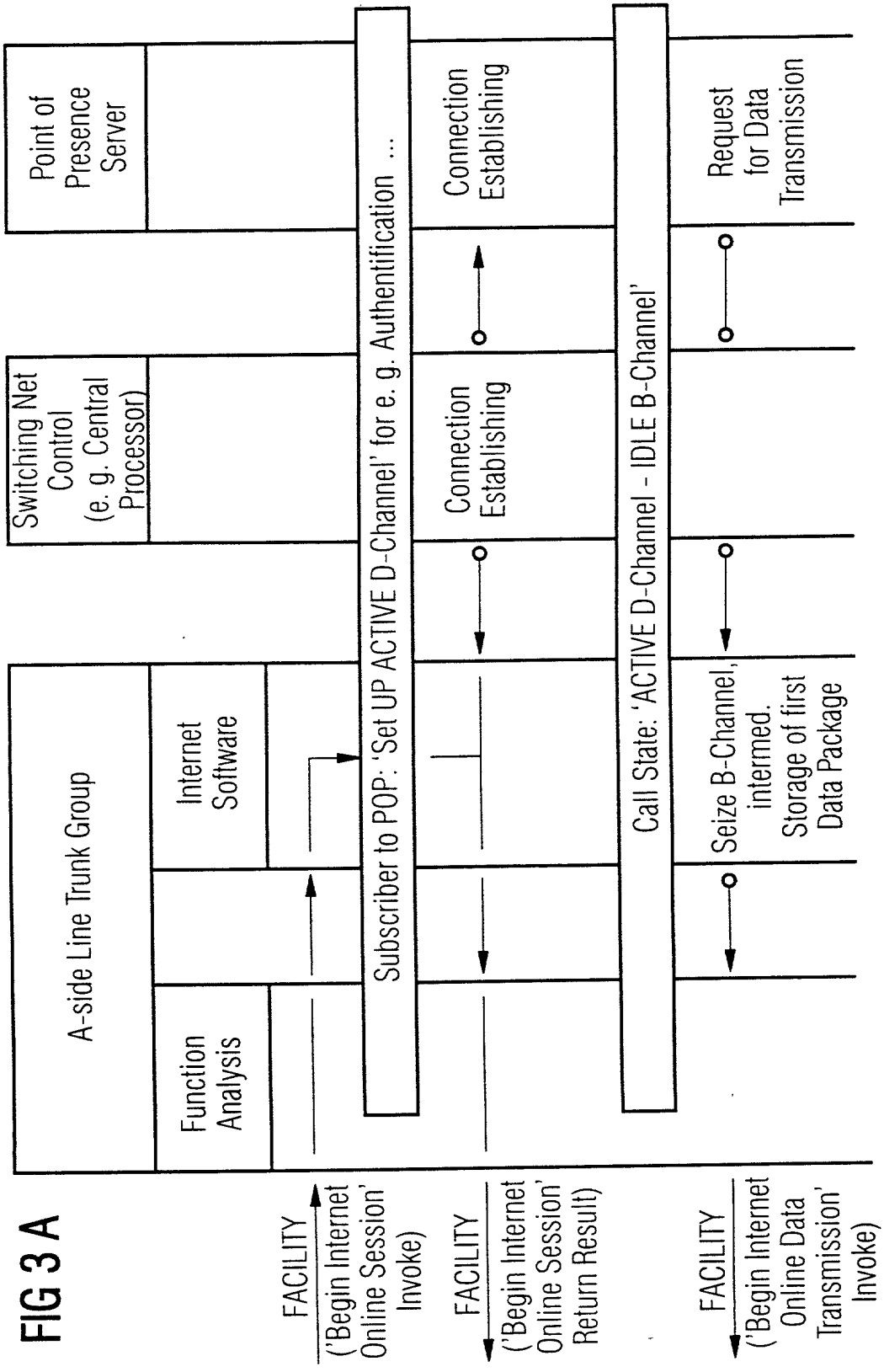


FIG 3 A


A-side Line Trunk Group
Function Analysis
Internet Software
Switching Net Control (e. g. Central Processor)
Point of Presence Server
Subscriber to POP: 'Set UP ACTIVE D-Channel' for e. g. Authentification ...
Connection Establishing
Connection Establishing
Request for Data Transmission
Call State: 'ACTIVE D-Channel - IDLE B-Channel'
Seize B-Channel, intermed. Storage of first Data Package
FACILITY ('Begin Internet Online Session' Invoke)
FACILITY ('Begin Internet Online Session' Return Result)
FACILITY ('Begin Internet Online Data Transmission' Invoke)

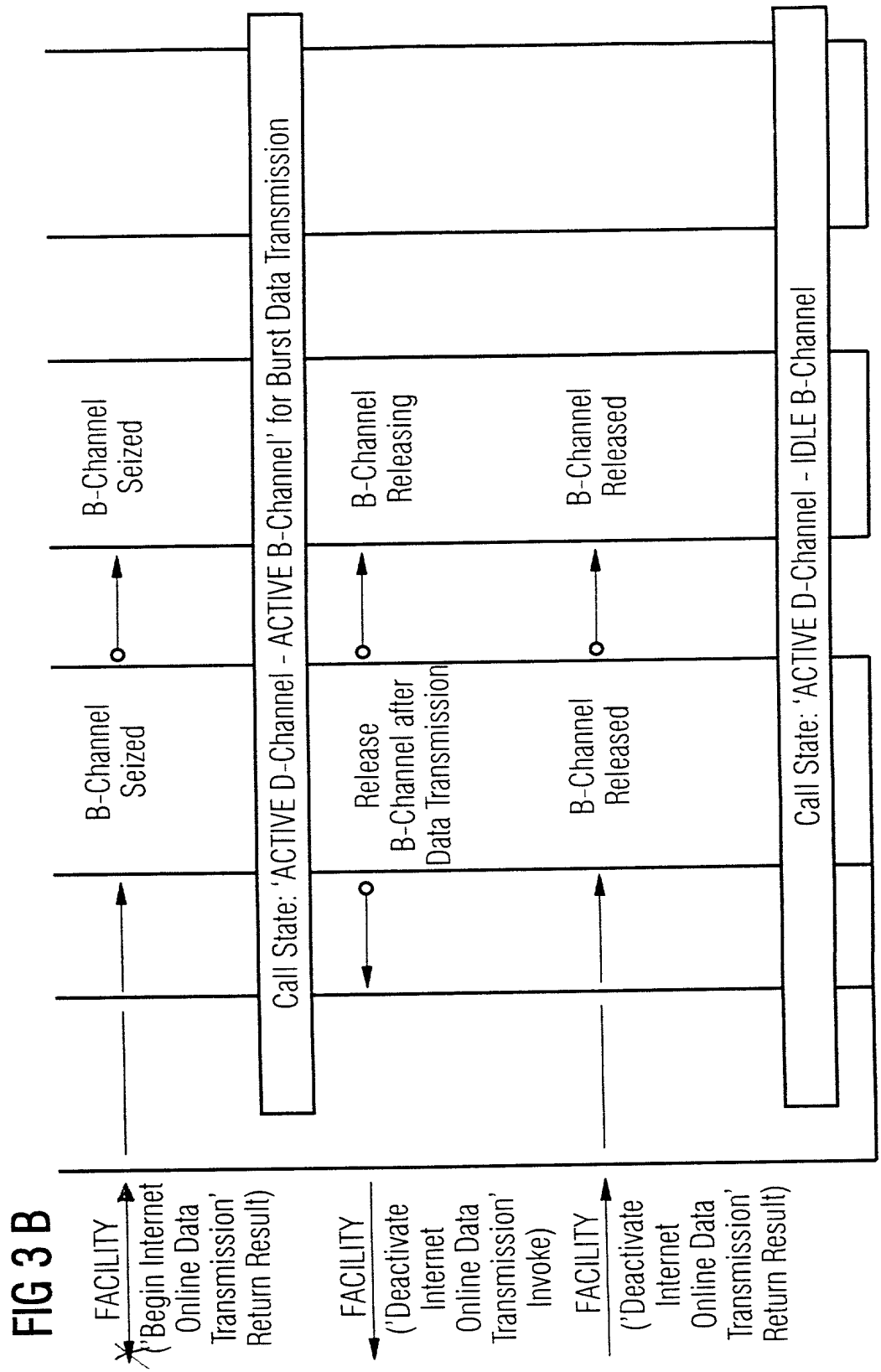

FACILITY
('Begin Internet Online Data Transmission' Return Result)
B-Channel Seized
B-Channel Seized
Call State: 'ACTIVE D-Channel - ACTIVE B-Channel' for Burst Data Transmission
B-Channel Releasing
B-Channel Released
FACILITY
('Deactivate Internet Online Data Transmission' Invoke)
Release B-Channel after Data Transmission
B-Channel Released
FACILITY
('Deactivate Internet Online Data Transmission' Return Result)
Call State: 'ACTIVE D-Channel - IDLE B-Channel

FIG 3 B

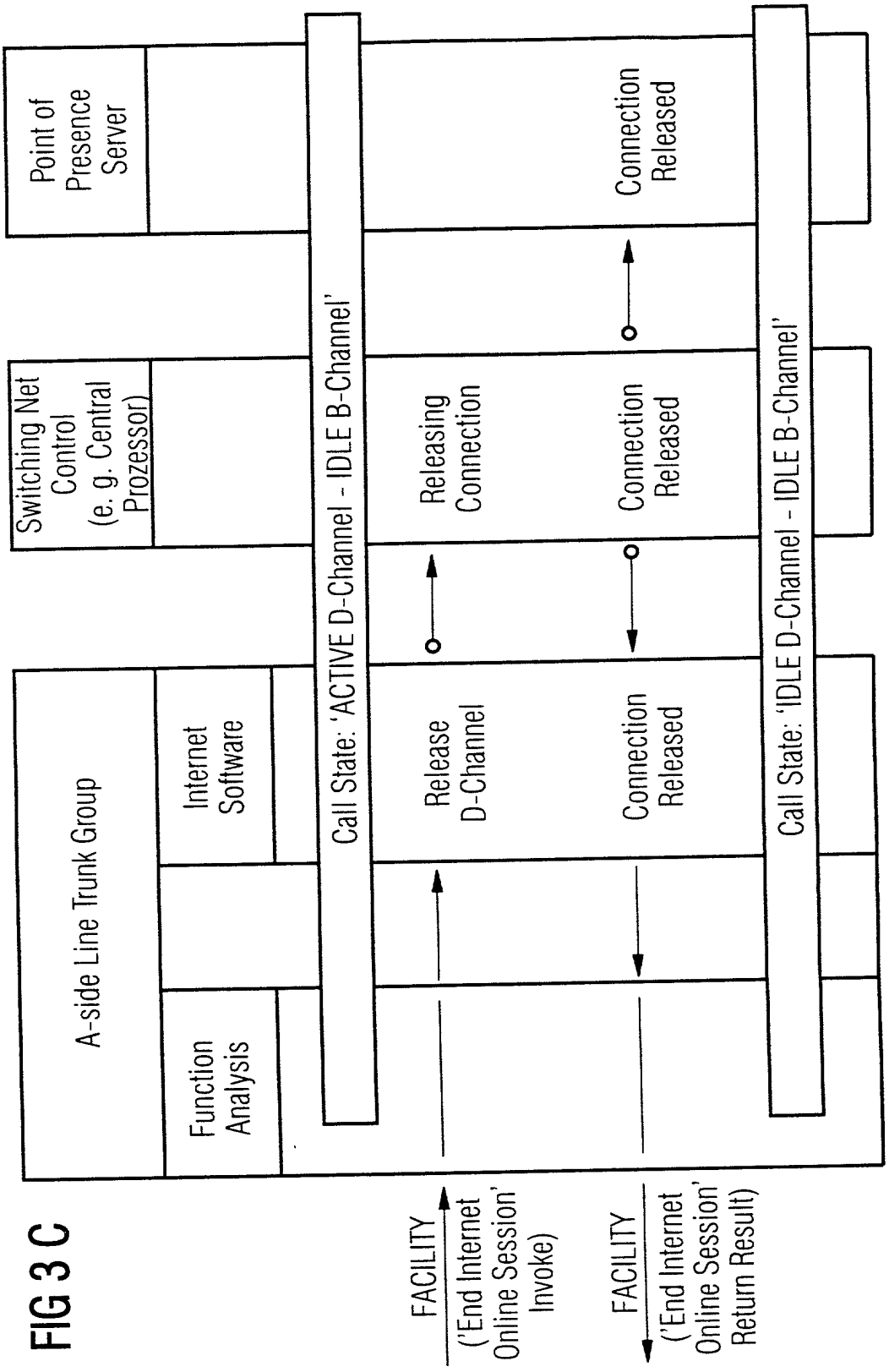
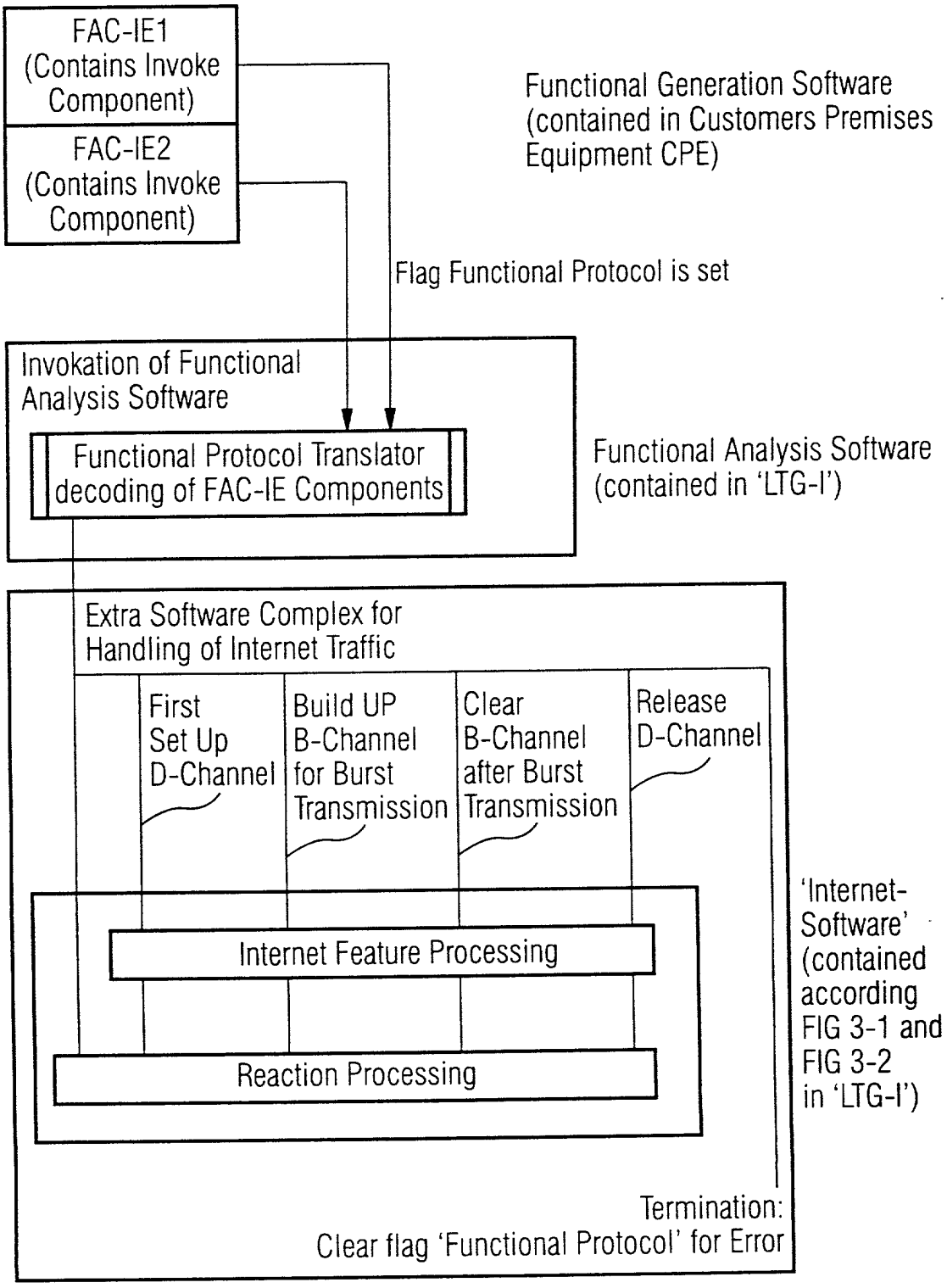

A-side Line Trunk Group
Function Analysis
Internet Software
Switching Net Control (e. g. Central Prozessor)
Point of Presence Server
Call State: 'ACTIVE D-Channel - IDLE B-Channel'
Release D-Channel
Releasing Connection
Connection Released
Connection Released
Connection Released
Call State: 'IDLE D-Channel - IDLE B-Channel'
FACILITY ('End Internet Online Session' Invoke)
FACILITY ('End Internet Online Session' Return Result)

FIG 3 C

FIG 4 SCHEMATIC ILLUSTRATION OF THE PROCESSING BY THE SOFTWARE OF THE SWITCHING CENTER



Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Verfahren zur Behandlung von Dienstverbindungen in einem Kommunikationsnetz

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)
☒ hier beigefügt ist.
☐ am _____ als PCT internationale Anmeldung PCT Anmeldungsnummer _____ eingereicht wurde und am _____ abgeändert wurde (falls tatsächlich abgeändert).

(check one)
☐ is attached hereto.
☐ was filed on _____ as PCT international application PCT Application No. _____ and was amended on _____ (if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign appplications
Priorität beansprucht

			Priority Claimed	
96116505.7	Germany (EP)	15. Oktober 1996	☒	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35. United States Code. §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhängig, aufgegeben)	(Status) (patented, pending, abandoned)
(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhängig, aufgeben)	(Status) (patented, pending, abandoned)

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Patent and Trademark Office-U.S. DEPARTMENT OF COMMERCE

German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: *(Name und Registrationsnummer anführen)*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

And I hereby appoint

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1-00

2-00

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(Supply similar information and signature for third and subsequent joint inventors).

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Unterschrift des Erfinders Datum	Inventor's signature Date
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Postanschrift	Post Office Address
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Unterschrift des Erfinders Datum	Inventor's signature Date
Wohnsitz	Residence
Staatsangehörigkeit	Citizenship
Postanschrift	Post Office Address
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Unterschrift des Erfinders Datum	Inventor's signature Date
Wohnsitz	Residence
Staatsangehörigkeit	Citizenship
Postanschrift	Post Office Address

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).